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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/729,261	12/05/2003	Robert R. Rice	000352-804	1178
26294	7590	04/10/2006	EXAMINER	
TAROLLI, SUNDHEIM, COVELL & TUMMINO L.L.P.			VAN ROY, TOD THOMAS	
1300 EAST NINTH STREET, SUITE 1700			ART UNIT	
CLEVEVLAND, OH 44114			PAPER NUMBER	
			2828	

DATE MAILED: 04/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/729,261

Applicant(s)

RICE ET AL.

Examiner

Tod T. Van Roy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 01/23/2006
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

The examiner acknowledges the amending of claim 11.

### ***Response to Arguments***

Applicant's arguments see Remarks, filed 01/27/2006, with respect to claims 1-11 have been fully considered and are persuasive. The rejection of claims 1-11 has been withdrawn.

The examiner agrees that the Siegman reference teaches away from the use of Raman processes, therefor the previous rejections have been withdrawn.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-5, and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rice (US 6363087) in view of Grubb (US 5323404).

With respect to claims 1 and 2-4, Rice teaches a multimode optical fiber that favors lower order modes (col.6 lines 30-39) comprising: a core having a longitudinal optical axis including providing a desired refractive index profile and a desired Raman gain coefficient profile that favors lower order modes (col.2 lines 48-58, col.6 lines 30-38); and a cladding region surrounding the core and having a different refractive index than the core (col.2-3 lines 67-1). Rice does not teach the fiber core to have radially dependent amounts of dopant materials to affect the Raman gain profile. Grubb teaches a single mode optical fiber which uses radially dependent amounts of dopant material (GeO<sub>2</sub>, col.5 line 3) to affect the gain and the refractive index (fig.6, col.5 lines 1-11, fiber is single mode, but the teaching is that of a doping profile which increases Raman processes). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the optical fiber of Rice with the doping profile of Grubb in order to guide the lowest order, or selected lower order modes, in the guide and obtain high output powers (Grubb, col.5 lines 1-11, which when combined would inherently allow higher Raman gain along the optical axis and promote lower order modes and discriminate against higher order modes- as the prior art fiber would have identical properties to the applicant's fiber).

With respect to claim 5, Rice and Grubb teach the fiber as outlined in the rejection to claim 1, and Grubb further teaches independent control of the refractive index and gain (dopants taught to be chosen to change profile, col.5 lines 4-6). It would

have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser of Rice and Grubb with the index/gain design of Grubb in order to allow for the choice in design of using gain and/or index guiding to properly couple the optical mode(s) through the waveguide.

With respect to claims 12-13, Rice and Grubb teach the optical fiber as defined in claim 1, wherein Grubb's doping profile comprises radially dependent amounts of dopant materials comprising a minimum amount of dopant material near an interface between the core and the cladding region with a gradual transition to a maximum amount at the optical axis (fig.2, inherently providing for higher Raman gain along the optical axis, also, Grubb col.5 lines 1-4).

Claims 6-9, 11, and 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rice and further in view of Grubb and Clarkson (WO 02/50964 A2).

With respect to claims 6-7, Rice and Grubb teach the fiber as outlined in the rejection to claim 1 above, but do not teach a diode laser array providing pump power to the fiber, means for launching the pump power into the fiber, and reflective means defining a laser cavity. Clarkson teaches a fiber laser system (fig.8a) which includes a diode laser array providing pump power to the fiber (fig.8a #13), means for launching the pump power into the fiber (fig.8a #15), and reflective means defining a laser cavity (fig.8a #50, 55). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the fiber of Rice and Grubb with the fiber laser system of

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Clarkson to pump the fiber gain medium and provide feedback allowing for generation of Raman amplification and oscillation of the laser signal for transmission.

With respect to claims 8-9, Rice, Grubb, and Clarkson teach the fiber laser as outlined in the rejection to claim 6, and Clarkson additionally teaches a highly reflective mirror at one end (fig.8a #50, pg.19 lines 20-25), and a partially transmitting mirror at the other (fig.8a #55, pg.21 lines 18-21), including outputting an essentially collimated beam to the output mirror (pg.21 lines 3-5). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the fiber laser of Rice, Grubb and Clarkson with the mirror reflectivities and lenses of Clarkson in order to allow for the oscillation of a given percentage of the light input into the fiber, to make use of the gain medium, as is well known in the art, as well as to properly spatially position the beam for coupling to any additional optics.

The method of claim 11 is rejected as being taught by Rice, Grubb, and Clarkson as outlined in the rejection to claim 6.

With respect to claims 14-17, Rice, Grubb, and Clarkson teach the fiber laser and method as outlined in the rejection to claims 6 and 11, wherein Rice teaches a multimode input (col.4 lines 32-36), and Grubb's doping profile comprises radially dependent amounts of dopant materials comprising a minimum amount of dopant material near an interface between the core and the cladding region with a gradual transition to a maximum amount at the optical axis (fig.2, inherently providing for higher Raman gain along the optical axis, also, Grubb col.5 lines 1-4).

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rice, Grubb, Clarkson, and further in view of Paldus et al. (US 2003/0161361).

With respect to claim 10, Rice, Grubb and Clarkson teach the fiber laser system as outlined in the rejection to claim 6, including the use of multiple lenses (Clarkson, pg.21 lines 6-7), but do not teach the use of a pinhole filter. Paldus teaches a laser system using a pinhole filter ([0071]). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser system of Rice, Grubb, and Clarkson with the filter of Paldus in order to utilizing a bandpass method to spatially filter the output light.

### ***Conclusion***

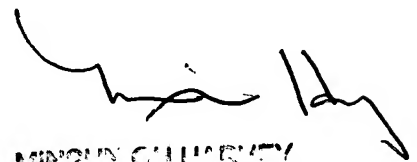
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tod T. Van Roy whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TVR



MIRSUN CHIKAROVA  
PRIMARY EXAMINER